Cristian PANTEA

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EMPLOYMENT / EDUCATION

Oct 2008-present	***Research Scientist*** at MPA-11, Sensors & Electrochemical Devices Los Alamos National Laboratory
Aug 2007-Oct 2008	***Limited-Term Staff Member*** at MPA-11, Sensors & Electrochemical Devices Los Alamos National Laboratory
Nov 2006-Aug 2007	***Postdoctoral Research Associate*** at MPA-11, Sensors & Electrochemical Devices Los Alamos National Laboratory
Dec 2004-Nov 2006	***Postdoctoral Research Associate*** at MST-NHMFL and LANSCE-12, Los Alamos National Laboratory
Jan 2004-Dec 2004	***Graduate Research Assistant*** at MST-NHMFL and LANSCE-12 Los Alamos National Laboratory
Jan 2003-Jan 2004	***Graduate Research Assistant*** at Manuel Lujan Jr. Neutron Scattering Center (LANSCE-12), Los Alamos National Laboratory
Jan 2000-Dec 2004	Texas Christian University, Department of Physics and Astronomy, Fort Worth, TX 76129 ***PhD - Chemical Physics*** *Thesis: "Kinetics of diamond-silicon reaction under high pressure-high temperature conditions"* Supervisor: Dr. T. Waldek Zerda
Aug 12-25, 2001	2nd National School on Neutron and X-ray Scattering Argonne National Laboratory, IL
Apr 1996-Jan 2000	***Graduate Research Assistant***, Electrochemical Sensors Department, Institute of Chemistry "Raluca Ripan", Fintinele St.30, 3400 Cluj-Napoca, Romania
1995-1996	"Babes-Bolyai" University, Department of Physics M. Kogalniceanu St.1, 3400 Cluj-Napoca, Romania ***MSc - Physics of Oxide Materials*** *Thesis: "Qualitative study of the structure of $xCuO\cdot(1-x)[3B_2O_3\cdot K_2O]$ glasses"*

1990-1995 "Babes-Bolyai" University, Department of Physics
M. Kogalniceanu St.1, 3400 Cluj-Napoca, Romania
BSc - Physics Engineering
Thesis: "EPROM encrypter with access time determination"

RESEARCH EXPERIENCE

► Oct 2008 – present — Los Alamos National Laboratory,
MPA-11, Sensors & Electrochemical Devices
Research Scientist

- Continuing work on acoustics (see below)
- Defect and/or impurities determination using ultrasonic methods on systems related to industry (electronics, automotive, beverage, etc.).
- Development of new non-invasive/non-destructive nonlinear acoustic technique for characterization of materials.

► Aug 2007 – Oct 2008 — Los Alamos National Laboratory,
MPA-11, Sensors & Electrochemical Devices
Limited-Term Staff Member

- Acoustic studies on oil-industry complex systems
  - nonlinear imaging outside borehole (acoustic "flashlight")
  - drill bit – rock contact imaging
  - Swept-Frequency Acoustic Interferometry (SFAI) of multi-phase oil-industry related systems
  - oil pipe corrosion
  - oil-water emulsion separation

► Dec 2006 – Aug 2007 — Los Alamos National Laboratory,
MPA-11, Sensors & Electrochemical Devices
Postdoctoral Research Associate

- Swept-Frequency Acoustic Interferometry (SFAI) of liquid systems
- Pulse-echo studies of solid objects immersed in liquid medium
- Resonant Ultrasound Spectroscopy of different types of sandstone

► Dec 2004 – Dec 2006 — Los Alamos National Laboratory,
MST-NHMFL
Postdoctoral Research Associate

- Studies of elastic constants under pressure for negative-thermal-expansion compounds (ZrW_2O_8, ZrV_2O_7, $Sc_2W_3O_{12}$, etc.) using RUS (Resonant Ultrasound Spectroscopy) and Pulse-Echo methods.
- Studies of elastic constants of transition elements, Os, Re, Ir, Ru (elements with highest bulk modulus after diamond).
- Development of a pulse-echo ultrasonic measurement system and signal manipulation in a moissanite anvil cell for the study of elastic properties of materials.
- Development of a high-pressure cell (moissanite anvil) for simultaneous use in ultrasonic pulse-echo technique, neutron scattering, and Raman spectroscopy/imaging for the study of materials.

► Jan 2004 – Dec 2004 Los Alamos National Laboratory,
MST-NHMFL/TCU
Graduate Research Assistant

- Development of a completely digitized ultrasonic pulse-echo method and the afferent algorithm for unambiguous determination of pulse transit time (from which the full tensor of elastic moduli can be determined).
- Studies of ultrasonic measurements at high pressure (ultrasonic interferometry and pulse-echo method) related to determination of elastic properties of materials.
- Structural investigations of nano-size materials (nanodiamond) using neutron scattering techniques: pair distribution function and inelastic scattering.
- Structural investigations of nano-size materials (nanodiamond) at extremely high pressures, 85 GPa, in a diamond anvil cell.

► Jan 2003 – Dec 2004 Los Alamos National Laboratory,
LANSCE-12/TCU
Graduate Research Assistant

- Development of novel nano-structured superhard materials (diamond and diamond-silicon carbide composites) at high pressure-high temperature conditions.
- Investigation of the phase diagram, equation of state (EOS), structure and properties of metals (Si, Ge), ceramics (SiC, Si_3N_4) and diamond composites using neutron and x-ray scattering and toroidal/multi-anvil cell.
- *in-situ* studies of kinetics of the reaction of silicon carbide formation in diamond-silicon carbide composites with precursors of different sizes, from microns to nanometers, using synchrotron x-ray diffraction and multi-anvil high pressure-high temperature cell.
- Development of the moissanite anvil cell for the study of clathrates at high-pressure/low temperature using neutron scattering and Raman spectroscopy.
- Investigations of pressure-temperature space, new high-pressure phases, structure and properties of nano-sized materials with synchrotron x-ray diffraction in multi-anvil or diamond anvil cell.

► Jan 2000 - Dec 2004 Texas Christian University
Department of Physics and Astronomy
Research Assistant/Teaching Assistant

- Development of a toroidal anvil high pressure-high temperature system to a 250-ton press, initially designed for the piston-cylinder system. Designed experiments and cell assembly for a routine operational mode. Designed a LabView interface for data acquisition for the toroidal/piston-cylinder system.
- Investigations of diamond-silicon carbide composite formation at high pressure and high temperature using x-ray diffraction, Raman spectroscopy and imaging, SEM.
- Studies of carbon black and polymers through Raman Imaging Spectroscopy for direct applications of rubber in the tire industry.
- Designed two labs for Physics II in which a LabView interface between the experimental setup and a computer made the data acquisition process much easier for students, and, at the same time, gave the students a better understanding of the interface between instruments and application software.

- Undergraduate physics laboratory teaching, graded homework and exam papers for undergraduate students.

► Apr 1996 - Jan 2000 — Institute of Chemistry "Raluca Ripan",
Electrochemical Sensors Department,
Fintinele St.30, 3400 Cluj-Napoca, Romania
Research Assistant – physicist

- Electrochemical Impedance Spectroscopy (EIS) studies of the electrical properties of thin film membranes: polymer ion-selective and SnO_2 ion-selective membranes.
- Entrapment studies of GlucoseOxidase (GOD) on polyamide support for enzyme electrodes in glucose detection
- Studies of functional characteristics of conductivity cells (spiral Ag, Pt)

EXPERIMENTAL SKILLS

- ✓ Swept-Frequency Acoustic Interferometry (SFAI)
- ✓ non-linear acoustic methods
- ✓ ultrasonic pulse-echo methods, ultrasonic interferometry
- ✓ Resonant Ultrasound Spectroscopy (RUS).
- ✓ single-crystal orientation and sample preparation for RUS and pulse-echo measurements (requires perfectly oriented samples, with flat and accurate parallel surfaces)
- ✓ experience in cryogenics and high-vacuum
- ✓ High Pressure-High Temperature: cylinder-piston, toroidal cell, multi-anvil cell (DIA and T-cup), diamond anvil cell.
- ✓ synchrotron x-ray scattering: NSLS (National Synchrotron Light Source), Brookhaven National Laboratory: X17B2, X3B1; APS (Advanced Photon Source), Argonne National Laboratory: 13BM-GSECARS, 16ID-HP-CAT.
- ✓ neutron scattering: LANSCE (Los Alamos Neutron Science Center), Los Alamos National Laboratory: HIPD (High Intensity Powder Diffractometer), HIPPO (High-Pressure Preferred Orientation Diffractometer), FDS (Filter Difference Spectrometer), NPDF (Neutron Powder Diffractometer).
- ✓ x-ray diffraction: powder diffraction, single crystal diffraction.
- ✓ Raman spectroscopy and imaging, SEM, TEM.
- ✓ programming, signal control and data processing software development (Java, VisualBasic, LabView).

COMPUTER SKILLS

Object-Oriented Programming: JAVA, VisualBasic, LabView
HTML editing
Windows, MS-DOS, UNIX operating systems
Microsoft Office Suite
several software packages used in data acquisition/manipulation

INVITED PRESENTATIONS

- Acoustic nonlinear beam formation and imaging
  Texas Christian University, Department of Physics and Astronomy, Fort Worth, TX, January 23, 2009
- Osmium's full elastic tensor between 5K and 300K
  152nd Meeting (4th joint meeting of the Acoustical Society of America and the Acoustical Society of Japan), Honolulu, Hawaii, 28 November-2 December 2006
- Pressure-induced elastic softening of monocrystalline zirconium tungstate at 300K
  MSCookies and Tea, LANL, August 2nd, 2006
- Diamond - Silicon Reaction under High-Pressure High-Temperature Conditions
  Lorand Eotvos University, Department of General Physics, Budapest, Hungary
  March 12, 2002

PROFESSIONAL ACTIVITIES

- ***Honors and Awards:***
  - Seaborg Institute Postdoctoral Fellowship
    MST-NHMFL, Los Alamos National Laboratory, 2006
  - Outstanding Student Presentation Award
    TSAPS Fall Meeting 2001, October 4-6, TCU, Fort Worth, Texas

- ***Professional Membership:***
  American Physical Society
  Acoustical Society of America
  IEEE - Ultrasonics
  Neutron Scattering Society of America

- ***Referee for:***
  Physical Review B
  Physical Review Letters
  Physica B
  Physics Letters A
  Computational Materials Science
  Diamond and Related Materials
  Optics Express

- ***co-Chair for:***
  Physical Acoustics: Sound Speeds, Phonons, and Thermodynamics of Condensed Matter
  152nd Meeting (4th joint meeting of the Acoustical Society of America and the Acoustical Society of Japan), Honolulu, Hawaii, 28 November-2 December 2006

- ***citations:***
  239 (ISI, *as of Nov 24, 2009*)
  h-index: 10

- ***featured publications:***
  - Pressure-induced elastic softening of monocrystalline zirconium tungstate at 300 K
    C. Pantea, A. Migliori, P. B. Littlewood, Y. Zhao, H. Ledbetter, J. C. Lashley, T. Kimura, J. Van Duijn, and G. R. Kowach
    Phys. Rev. B, vol. 73, no. 21, (2006), art. no. 214118.
    (also at http://arXiv.org/cond-mat/0509220)
    in ***Journal Club for Condensed Matter Physics***, Sep 1
  - Digital ultrasonic pulse-echo overlap system and algorithm for unambiguous determination of pulse transit time
    C. Pantea, D.G. Rickel, A. Migliori, J. Zhang, Y. Zhao, S. El-Khatib, R.G. Leisure, B. Li
    Rev. Sci. Instrum., vol. 76, no. 11, (2005), art. no. 114902
    in ***National High Magnetic Field Laboratory Reports***, vol. 13, No. 1, 2006, p.18
  - Kinetics of SiC formation during the high P-T reaction between diamond and silicon
    C. Pantea, G.A. Voronin, T.W. Zerda, J. Zhang, L. Wang, Y. Wang, T. Uchida, Y. Zhao
    Diam. Relat. Mater., vol. 14, no. 10, (2005), pp. 1611.
    in ***III-Vs Review,*** vol. 18, no. 7, Sep-Oct 2005, pp. 52-53.
  - Structural influence of erbium centers on silicon nanocrystal phase transitions
    R.A. Senter, **C. Pantea**, Y. Wang, H. Liu, T.W. Zerda, J.L. Coffer
    Phys. Rev. Lett., vol. 93, no. 17, (2004), pp. 175502.
    in ***Virtual Journal of Nanoscale Science & Technology***, vol. 10, no. 18.